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09/641,383	08/17/2000	John Wilkes	10004565	5243

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EXAMINER

INOA, MIDYS

ART UNIT

PAPER NUMBER

2188

DATE MAILED: 03/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

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# Office Action Summary

Application No.

09/641,383

Applicant(s)

WILKES ET AL.

Examiner

Midys Inoa

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 August 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 09 December 2002 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Drawings*

1. The corrected or substitute drawings were received on December 9<sup>th</sup>, 2002. These drawings are acceptable.

### *Specification*

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

The disclosure does not provide an adequate description of the eviction failure in claims 5 and 13. The passage on page 11, lines 15-23 of the specification does not suffice as a description for the occurrence of an eviction failure. This passage simply explains steps that are taken after an eviction operation, if such operation becomes necessary. It also briefly mentions that if the eviction does not take place, a demoted data block is discarded. However, it does not explain the reasoning or occurrence behind the failure of an eviction operation.

### *Claim Rejections - 35 USC § 112*

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 5 and 13 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. It is not clear where the specification supports or explains

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the concept of failure of the eviction operation. The passage on page 11, lines 15-23 of the specification does not suffice as a description for the occurrence of an eviction failure. This passage simply explains steps that are taken after an eviction operation, if such operation becomes necessary. It also briefly mentions that if the eviction does not take place, a demoted data block is discarded. However, it does not explain the reasoning or occurrence behind the failure of an eviction operation.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-5, 8-13 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi (5,933,853) in view of Yang et al. (6,243,795).

Regarding Claims 1 and 3, Takagi discloses a system including a cache memory 4 ("host cache") and a HDD cache 5 ("storage cache") where data is being transferred between the cache memory and the HDD cache (See Abstract). In Column 4, Lines 10-14, Takagi teaches the reading of program data from the HDD 3 ("storage system") to the CPU 1 ("Computer System") and refers to the cache memory 4 ("host cache") as a high-level data storage device (Column 4, Lines 30-32). Takagi also teaches the situation in which data is being staged out or demoted from the cache memory 4 to the HDD cache 5; where in "staging out" involves the moving of data out of the cache memory and into the cache HDD ("the information is not stored in a storage system cache... and is stored in a host cache", Column 5, Lines 22-25). Takagi does not teach

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performing a demote operation if the information is clean. Yang et al. teaches the discarding (“demoting”) of a clean block of data to make room for new requests in the primary cache (Column 4, lines 32-35). It would have been obvious to one of ordinary skill in the art at the time the invention was made to integrate the clean data demote operation of Yang into the system of Takagi because demoting clean data to make room is advantageous since clean data has not yet been modified and no new information would be lost in the discarding of such data.

Regarding Claim 8, Takagi discloses a system with a cache memory 4 (“host cache”), a HDD cache 5 (“storage system cache”), a CPU 1 (“host system”), and an array of optical discs 22a-22d (“storage media”) in which data is being demoted or staged out from cache memory 4 to HDD cache 5 (See Figure 1). In the demotion process, the data is transferred and stored in the HDD cache 5 and therefore, removed from cache memory 4; thus, exclusion is maintained (“Means for exclusive caching”, see Column 5, Lines 22-25). It is understood that “staging out” involves the moving of data out of the cache memory and into the cache HDD (“the information is not stored in a storage system cache... and is stored in a host cache”). Takagi does not teach performing a demote operation if the information is clean. Yang et al. teaches the discarding (“demoting”) of a clean block of data to make room for new requests in the primary cache (Column 4, lines 32-35). It would have been obvious to one of ordinary skill in the art at the time the invention was made to integrate the clean data demote operation of Yang into the system of Takagi because demoting clean data to make room is advantageous since clean data has not yet been modified and no new information would be lost in the discarding of such data.

Regarding Claims 2 and 9, Takagi teaches the demotion of data from the cache memory 4 to the HDD cache 5 where the process of demoting or staging out includes the operation of

writing back or evicting data to the HDD cache 5 (Column 5, Line 25). Takagi discloses that the demotion process between the cache memory 4 and the HDD cache 5 is being done through the communication path labeled as a “system bus” in Figure 1.

Regarding Claim 4 and 12, Takagi teaches that in the process of staging out, data is being stored in the free areas of the HDD cache 5, in this case, the empty areas are predetermined sub areas of the HDD cache since they must be identified as “free” prior to the staging out of data (Column 5, Lines 22-35).

Regarding Claims 5 and 13, Takagi teaches the eviction of data from HDD cache 5 to the optical disk 24 (“storage media”) in Column 5, Lines 30-31 (“Performing an eviction from storage system cache”). Takagi also teaches that in cases where “writing is not effected”, the data is disposed of (“Discarding the information if the eviction fails”, see Column 5, Line 26).

Regarding Claims 10 and 11, Takagi teaches a system in which the communication control is connected to a LAN or network link (“Network Communication link”) and the components are connected through a computer bus (Column 4, Lines 43-48).

Regarding Claim 18, Takagi discloses the use of an array of optical disks as the storage media of his system (Column 1, Lines 12-13).

7. Claims 6-7 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi (5,933,853) in view of Yang et al. (6,243,795) as applied to claims 1-5, 8-13 and 18 above, and further in view of Nakamoto (6,253,290). Takagi does not teach the use of a shared status as the basis for eviction. Nakamoto discloses a method that uses the shared status of data to monitor write operations. In this method, unshared data is written back and shared data is written through (Column 2, Lines 48-52). It is understood that in order to for Nakamoto to

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distinguish between shared and unshared data, his system must keep track of the shared or unshared status of the data. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the shared status taught by Nakamoto as the means for eviction in Takagi in order to ensure that unshared data is properly secured in main memory while making space for shared, more frequently accessed data in the cache.

8. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi (5,933,853) in view of Yang et al. (6,243,795) as applied to claims 1-5, 8-13 and 18 above, and further in view of McIntosh-Smith (6,324,632). Takagi does not teach a partition in the storage cache where ~~one partition is for read-ahead data~~ ("other cached information") and the other is for exclusive caching. McIntosh-Smith discloses a partitioned cache where one of the partitions is allocated to a pre-fetched incoming data stream and the other is being used to store program data (such as that involved in exclusive caching). Please refer to the abstract. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Takagi system to include the partitioned cache in the McIntosh-Smith patent in order to ensure that pre-fetching operations and the exclusive caching system do not interfere.

9. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi (5,933,853) in view of Yang et al. (6,243,795) as applied to claims 1-5, 8-13 and 18 above, and further in view of How Computers Work by Ron White. Takagi does not specifically disclose the use of tape as storage media. White teaches that tape drives are the most traditional and one of the most convenient ways of backing up and storing data (Page 105). White also discloses that tape drives have become affordable. It would have been obvious to one of ordinary skill in

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the art at the time the invention was made to modify the Takagi's magnetic storage medium to be a tape drive since these are affordable and convenient storage devices.

***Response to Arguments***

10. Applicant's arguments with respect to claims 1 and 8 have been considered but are moot in view of the new ground(s) of rejection.

11. Applicant's arguments with respect to claims 6-7, 14-15, 16-17, and 19 are not persuasive.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Regarding Claims 6-7 and 14-15, Nakamoto's disclosure of a multiprocessor system that avoids the write monitoring of a cache does not contribute to the rejection of the claims in question.

Regarding Claims 16-17, the examiner agrees that McIntosh-Smith does not teach reading a set of information from a storage system such that the information is not stored in a storage system cache and is stored in a host cache. The examiner also agrees that McIntosh-Smith discloses partitioning of a cache. This reference's disclosure of the partitioning of a cache is the reason that it was combined with Takagi.

Regarding Claim 19, the examiner agrees that White does not teach reading a set of information from a storage system such that the information is not stored in a storage system cache and is stored in a host cache. The examiner also agrees that White teaches the backing up



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of a drive with a tape drive. This reference teaches the advantages of using a tape drive; this disclosure is the reason that this reference was combined with Takagi.

### *Conclusion*

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Midys Inoa whose telephone number is (703) 305-7850. The examiner can normally be reached on M-F 7:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Kim can be reached on (703) 305-3821. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-6606 for regular communications and (703) 308-6606 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

*Midys Inoa*  
Midys Inoa  
Examiner  
Art Unit 2188

MI  
March 10, 2003

*Reginald D. Bragdon*  
REGINALD G. BRAGDON  
PRIMARY EXAMINER